Techtalk:
Wireless Networking

By David C. Caverly and Lucy MacDonald

In the last column, we discussed standards for professional growth in educational technology for developmental educators. These standards focus on competence with technology applications for improving instruction. We also discussed how these standards might be implemented through four stages of technology integration: adopting, adapting, appropriating, and innovating. Wireless networking exemplifies a new technology application with tremendous potential for educators. We will use these established four stages to explore its implementation.

Adopting and Adapting

As a new technology emerges, instructors first consider whether to adopt it into their instructional repertoire. If they choose to use it, they consider how they might adapt instruction to fit. Exploring wireless networking we realized that we were already wireless in many ways: We use TV remote controls, portable phones, and cell phones. But how useful is it for our instruction?

For example, most of us use second generation (2G) cell phones. Some phones have a GSM (Global System for Mobile communication) capability, allowing us to phone from almost anywhere. Currently, over 1 billion people worldwide have GSM phones; that's 17% of the world's population or 1 out of every 6 people (Global Reach, 2004). Still, 2G cell phones have little instructional potential as all they can provide is voice or brief text messages which might be used in tutoring students.

More sophisticated 2.5G phones are also available running GPRS (General Packet Radio Service). Providing data transfer at 70 Kbps (Kilobits per second), these phones give students access to the Internet slightly faster than a dial-up modem. Soon, 3G phones (3GSM or EDGE, Enhanced Data rates for GSM Evolution) will provide the potential of 384 Kbps access, which is closer to high-speed Internet access. Many of these 2.5G phones are "smartphones," combining GPRS with PDA (Personal Digital Assistant) functions such as information management, e-mail, web browsing, basic word processing, spreadsheets, and *PowerPoint* editing capabilities (Burton & Uslan, 2004). Through smartphones students could access developmental online services and classes in lieu of purchasing a computer and Internet service.

For short-distance connections (3-30 feet), another wireless technology, called Bluetooth™ , is available. Bluetooth™ devices can automatically connect to each other creating what is called a piconet network. Most of these devices are programmed to only recognize other Bluetooth™ devices within the piconet, so one Bluetooth™ wireless mouse doesn't interfere with another. With transfer speeds of 430 Kbps, one can wirelessly connect hardware like a mouse, keyboard, printer, PDA, headset, or cell phone, thus reducing the morass of cables cluttering labs and classrooms. If there is no Bluetooth™ in a device, adaptors can be added that plug in externally via USB or through a slot with a PC, Flash, or SD card. A piconet could allow students to easily interconnect their cell phones, PDAs, and laptops over a short distance to access print services, to collaborate on writing, or to share files.

For wider network connections (100 feet), there is Wi-Fi (or wireless local area networks) which allows us to connect computers and other devices at significantly faster data transfer speeds (54 Mbps vs. 0.43 Mbps for Bluetooth™ ; Brisbin, 2004). Wi-Fi networks can provide wireless access throughout the developmental classroom, learning center, or campus. Devices like *Airport Express* (Apple Computer, 2004a) extend Wi-Fi so that students can wirelessly listen to e-books for fluency development or print to a wireless printer. Students could access the Wi-Fi network anywhere on campus with their cell phone, PDA, or laptop computer to share files, collaborate on projects, present slide shows, and learn on the Internet. Not being tethered to wires improves the chances that they will take advantage of developmental education and learning assistance services.

Over the next few years, more sophisticated wireless networks will be available. Closest on the horizon is ultra-wideband networking (UWB), providing even faster connections with data transfer speeds of 480 Mbps over a short distance (10-30 feet; Intel, 2004). UWB wireless networking will make technology less visible, easing production, speed of delivery, and sharing for students.

Next on the horizon will be WiMax (Worldwide Interoperability for Microwave Access; Blau, 2004). It will provide high-speed wireless access over 30 miles. Between broad 3G cellular and WiMax wireless networks, Internet access for online courses or tutoring will become available for developmental students in rural areas. Later, mobile WiMax access will appear, allowing commuter students to access the Internet while on a bus or train.

Even further on the horizon are personal servers (Want, 2004): portable, wireless hard drives and processors that fit in your hand, like the *iPod* that is now used for music, addresses, phone numbers, and calendars (AppleComputer, 2004b). These devices will allow students to walk up to any desktop computer on campus (loaded with receptive security software) and wirelessly access their files and programs from their personal server using the computer's high-speed processors, Internet access, and printers. In the mean time, software like *PocketMac* (Information Appliance Associates, 2004) allows *Entourage/Outlook, Word*, *Excel,* and *iTunes* data to be transferred from a Mac or PC to an *iPod,* PDA, or smartphone. Soon devices will also have miniature data projection cameras built in that wirelessly beam a virtual screen and keyboard on to any flat surface (Alpern, 2003; Fraunhofer Society, 2004), thus reducing the need for keyboards and monitors. Rather than owning the hardware, students could simply own a wireless hard drive, much like many of them now own jump drives.

By adopting wireless networking, it is possible to simplify the lives of faculty and students alike. Adapting the traditional uses of cellular, Bluetooth™ , and Wi-Fi networks increases access for developmental education faculty and students, thus improving services and instruction. Still, these are rather limited integrations of technology into developmental education. Next, consider how developmental educators might appropriate each of these wireless networks into instruction and innovatively create new developmental instructional strategies.

Appropriating and Innovating

One way to appropriate cellular networks is to ask students to use simple text messaging on their smartphones to practice small-group discussions in class or for a course management system like *Blackboard* or *WebCT*. After the inevitable yes or no responses, instruction could model the benefits of thoughtful responses and leading questions. Students might send cell phone text messages to the instructor about points they don't understand, thus facilitating the development of their metacognition. Students could also send text messages to students in developmental education programs around the country, sharing strategies and task demands. Wi-Fi video cameras could tape classes for absent students or provide a live video feed from a content course to a linked developmental course or lab as instructors model note taking strategies in that content class. Using UWB wireless, students might produce an instructional video on a learning strategy and transfer it to a data projector or a high-definition TV to

teach their peers and receive feedback. Later, they could transfer it to a desktop or laptop computer to burn a DVD for future students' use. Students at a distance could use WiMax to get access to just-in-time tutoring and be supported by free whiteboards like *Imagination Cubed* (General Electric, 2004), allowing distance students to participate when they might not be able to otherwise. Personal servers could allow larger collections of data to be physically transferred from one computer to another such as the instructional video we just described. When these files outgrow the personal servers, they could be networked together, allowing an even larger multimedia project to be shared. The use of technology tools for learning becomes easier and more likely to occur when students and faculty are not also struggling with hardware connections but seamlessly connect.

Conclusion

Although some of these adoptions, adaptations, appropriations, and innovations can be done in a wired network, wireless networking allows secure, quick, easy connections over both short and long distances. Wireless computing will simplify students' lives and make technology invisible, increasing the chances of its use.

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NADE News: NADE Certification

By Dessie S. Williams, NADE President-Elect

NADE is committed to promoting excellence in delivery of educational opportunities to students at institutions of higher learning, and one process used to assess this professional standard is certification. Since 1999, NADE has certified college and university developmental education programs throughout the country in three major components: Tutoring Services, Adjunct Instruction (Course-Based Learning Assistance programs), and Developmental Coursework. NADE's Certification Council, along with its volunteer reviewers, works to certify successful programs on three levels: General, Advanced, and Distinguished. General certification criteria focus upon the extent to which the component serves students. Advanced certification addresses the impact of the component on the short-term academic success and persistence of students. To receive Distinguished certification, an institution must provide data on the impact of the component on the long-term academic success of students. Together, the council and reviewers recognize and validate model programs that exemplify best practices in developmental education and reflect advancement of research in the field.

The certification process includes the following:

- participation in a NADE Certification Training Institute;
- submission of a preliminary application, theoretical framework, portions of the self-study, and payment of a fee;
- collection and organization of the results, including analysis and discussion of data and changes made resulting from the ongoing, systematic evaluation; and
- submission of data and the remainder of the self-study for full application review.

Benefactors of certification are students, developmental programs, and institutions. Ultimately, students gain from the student-centered focus of certification, developmental programs use an assessment model to bring about positive changes in the program, and institutions demonstrate accountability through student-centered outcomes.

Responses from institutions that have completed this rigorous assessment have been overwhelmingly positive. Follow-up reports consistently indicate the institutions' satisfaction with this evaluation process that has enhanced their professional practices and redefined campus perceptions of their programs. NADE selects the very best reviewers to assure that a high level of certification is upheld and preserved. NADE encourages institutions to apply for NADE certification to meet standards necessary to qualify for one of the highest commendations awarded by our association. Contact the Certification Council at www.nade.net today, and start this process for your institution.

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